Fall 2020

The Formative Assessment Process: Influence and Impact

Tawyne A. Gibson

The Formative Process: Influence and Impact

Tawyne A. Gibson

Northwestern College

An Action Research Project Presented

in Partial Fulfillment of the Requirements

For the Degree of Master of Education

Dr. Angila Moffitt

December 6, 2020

Table of Contents

Abstract

This action research study investigated how formative data use influences teaching and learning, and what impact the formative process has on student outcomes. The study took place in a first-grade classroom with a group of five students over the course of four weeks. Participants were selected for the study because they scored in the 2nd to 11th percentile rank on the FastBridge Early Reading English assessment. Quantitative data was collected weekly for each of the four weeks using FastBridge Word Segmenting progress monitoring and then compared to baseline data taken before the study. A one-way between subjects ANOVA test was used to compare FastBridge Word Segmenting progress monitoring mean scores. Findings indicate a statistically significant difference between groups. The researcher concludes formative data use does influence teaching and learning as evidenced by positive student outcomes.

The Formative Process: Influence and Impact

According to Dorn (2010), "Several decades worth of research on formative assessment point in a similar direction: When used properly, formative assessment is one of the most powerful tools available to guide classroom decisions" (p. 325). Formative assessment is a method that continues to be a powerful tool assisting educators in determining what students know and are able to do. Greenstein (2010) explains that formative assessment provides teachers with data that can be used to inform their teaching practices and improve student learning outcomes. This happens while learning is in progress and learning outcomes can be influenced (Greenstein, 2010). Grant and Gareis (2017) describe formative assessment as "an instructional approach that has great potential to improve teaching and learning" (para. 1). According to Fisher and Frey (2014), consistent use of formative assessment leads to high levels of student learning, thinking, understanding, comprehending, and processing. Current research supports deliberate and consistent formative assessment data collection within the "classroom instruction cycles of curriculum-instruction-assessment" (Ford-Connors et al., 2016, p. 50).

Equipped with the knowledge and understanding of formative assessment, teachers should be successfully implementing the formative process in the classroom; however, the research suggests something different. The problem is, as Cotton (2017) observes, most teachers have some understanding of formative assessment, yet fail to implement it effectively. If teachers know what the research says about the formative process, then why are they not using what they know to improve student outcomes? Stefl-Mabry (2018) believes the formative process is not implemented effectively because most teachers misunderstand the concept of formative assessment. Govender (2019) reasons that "teachers' inability to implement formative assessment strategies revealed their lack of understanding of the formative process, as well as their

disconnect with the purpose of formative assessment" (p. 19). The field of education continues to be data-driven, which requires teachers to develop an understanding of the formative process. Over the course of this action research, the researcher endeavors to discover "new ways of pacing, differentiating, organizing and adapting instruction" to address the range of learning needs in the first-grade classroom (Sondergeld et al., 2010, p. 72).

The purpose of this study is to determine how formative data influences teaching and learning, and what impact the formative process has on first-grade student outcomes. If the researcher uses formative data to drive instructional decision-making, what impact will those instructional decisions have on student outcomes? The researcher hypothesizes that targeted instructional strategies will result in the acquisition of essential literacy skills and reduce or close existing achievement gaps. The potential impact will be measured by comparing the FAST Word Segmenting progress monitoring data collected before, during, and after the intervention to determine the intervention's impact on student outcomes. Additionally, the researcher will use anecdotal notes and classroom observations during the intervention to determine the influence on instructional practices.

Review of the Literature

Formative assessment has been the topic of educational debate dating as far back as the 1930s (Cotton, 2017). Although the term "formative assessment" was not coined until 1967 by Michael Scriven (Greenstein, 2010), Trumbull and Lash (2013) contend that Vygotsky's work forms much of the basis for its current conceptualization. Trumbull and Lash (2013) observe that formative assessment theorists have used Vygotsky's zones of proximal development to explain the gap between understanding and potential learning. Bloom's mastery learning concept is considered a contributing factor in how formative assessment is used today. Bloom reasoned that

students should demonstrate mastery at a current level of learning before moving on to the next level of learning (Greenstein, 2010). Years later, the work of Paul Black and Dylan Wiliam in their meta-analysis of more than 250 research studies would establish a compelling case for the use of formative assessment in today's classrooms (Greenstein, 2010).

Formative Assessment Defined

Formative assessment is a complex and dynamic process that is seamlessly integrated throughout instruction with the intent and purpose of yielding information about student learning (Clark, 2012; Stefl-Mabry, 2018; Trumbull & Lash, 2013). Woven throughout the instructional process, formative assessment adapts teaching practices in the moment to meet individual student needs (Cotton, 2017). By synchronously integrating formative assessment into the process of instruction, teachers are blending together past events with future possibilities to help students move towards achieving their learning goals (Clark, 2011; Clark, 2012). Therefore, the formative process affords teachers the opportunity to attend to students' evolving understandings while simultaneously unveiling confusions and creating space for new learning (Ford-Conners et al., 2016).

Essential Principles of Formative Assessment

The essential principles of formative assessment are (a) student focused, (b) instructionally informative, and (c) outcomes based (Greenstein, 2010). The first principle of formative assessment is student focused, which is contingent upon how students respond to instruction, rather than the instruction itself. Responsive teachers purposefully direct instruction toward students, actively consider how students receive it, understand it, and apply it, and then use the information to make instructional adjustments in the moment while learning is happening (Greenstein, 2010; Cotton, 2017). Awareness of students' strengths and weaknesses facilitates

focused attention on students' needs and makes room for appropriate scaffolds that support and guide students' progress towards learning goals (Clinchot et al., 2017). Ultimately, the goal of student-focused instruction is to provide opportunities for all students to improve and enhance their learning (Greenstein, 2010; Trumbull & Lash, 2013).

The second essential principle of formative assessment is instructionally informative. Instructionally informative assessment aligns standards, content and assessment and embeds assessment in instruction (Greenstein, 2010). The information gathered through this process is then used for making future instructional decisions to further student learning (Mcglynn and Kelly, 2017). When teachers make this shift in instructional practice, their role in the learning process shifts from prescriptive to responsive (Sondergeld et al., 2010) Responsive teachers who use data to *inform* their instruction rather than *evaluate* instruction, begin to practice reflective teaching (Clinchot et al., 2017; Curry et al., 2016). Curry et al. (2016) suggest that reflective teaching allows teachers to assess their own practices which leads to informed instructional techniques and enhanced goal setting for both teachers and students. Conclusively, instructionally informative assessment practices are crucial because reflective teachers are then able "to identify knowledge gaps, diagnose learning difficulties, perform error analyses, provide feedback and, ultimately, plan for improvement" (Govender, 2019, p. 3).

The final essential principle of formative assessment is outcomes based, which is focused on clarifying learning goals and emphasizing learning outcomes (Greenstein, 2010). Teaching and learning based on outcomes provides teachers, students, and parents with a common language and shared understanding of student progress (Curry et al., 2016). Students' level of mastery is determined by assessing students' work in relation to goals rather than traditional forms of grading which have included attitude and effort (Greenstein, 2010). When teachers

effectively clarify learning goals and emphasize learning outcomes, students are able to achieve high levels of learning.

Benefits of Formative Assessment

Formative assessment use in the classroom benefits educators and students. Ford-Conners et al. (2016) believe students benefit from in-the-moment decisions teachers make to refine their instruction thereby strengthening the entire learning experience. Curry et al. (2016) believe teachers benefit when they use data to inform, rather than evaluate, instruction thereby becoming reflective practitioners. Ozan and Kincal (2018) state another benefit of formative assessment is active feedback. Curry et al. (2016) suggest a benefit of formative assessment is it provides a structure for aligning standards, assessment, and daily instructional practices. Perhaps, though, the most salient benefit of formative assessment has been its impact on student achievement (Ozan and Kincal, 2018).

The use of formative assessment in the classroom strengthens the learning experience for students. Chappuis (2015) believes "formative assessment is a powerful tool in the hands of both teachers and students, and the closer it comes to everyday instruction, the stronger it is" (p. 8). When teachers gather information, interpret it, and make in-the-moment decisions to refine instruction, they strengthen the entire learning experience for students (Chappuis, 2015; Ford-Conners et al., 2016). Keeley (2017) suggests purposefully embedded formative assessment creates and supports teachable moments. In fact, the very theory of formative assessment could be said to hinge on the strategic instructional adjustment's teachers make to meet students' needs (Clark, 2012a). Effective teachers utilize the formative process to determine what their students know, then use the information to inform instruction, which results in strengthened learning experiences for students (Holler & Beers, 2012).

Formative assessment use in the classroom promotes reflective teaching. Holler and Beers (2012) describe reflective teaching as the instruction that happens after new information is learned about students' needs. Reflective teachers use data to inform instruction rather than evaluate instruction (Curry et al., 2016). Reflective teaching is a responsive approach that guides and adjusts instruction to better meet the needs of students (Holler and Beers, 2012). Green (2019) cautions that student learning may be limited if teachers fail to reflect on students' needs and make instructional modifications accordingly. McMillan et al. (2013) concur saying "instructional adjustments are essential to effective formative assessment" (pp. 5-6). When formative assessment is integrated into instruction, it enables reflective teaching that responds and adjusts to meet the needs of students and improve learning outcomes.

The use of formative assessment in the classroom benefits students through active feedback. Feedback, or collaborative instructional exchanges, is a dynamic and interactive part of the learning process where teachers and students work collaboratively to move learning forward (Ford-Conners et al., 2016). Feedback that promotes student learning is given in a timely manner and focuses on opportunities for improvement. McMillan et al. (2013) believe and Ozan and Kincal (2018) concur that formative assessment is more powerful in eliminating learning deficits when students are able to process feedback during instruction. Chappuis (2015) believes "it is not the provision of feedback that increases learning, but rather the student's actions in response to feedback" (p. 9). This shifts the cognitive load to the student and requires them to act on the feedback they have been given in order to move their learning forward. When students engage in this process, they develop a capacity for evaluative judgment of their own work. Panadero et al. (2018) believes students can develop their capacity to respond to feedback when they have been given the appropriate assistance and support to calibrate and refine their own, as

well as others, evaluative judgments. It is apparent that feedback, or collaborative instructional exchanges that are focused on promoting student learning, help students construct the knowledge and understanding necessary to reach high levels of achievement (Ford-Conners et al., 2016).

Another benefit of using formative assessment in the classroom is it provides a structure for aligning standards, assessment, and daily instructional practices (Curry et al., 2016). Nolen (2011) suggests formative assessment communicates not only values and standards, but also helps students know how their work compares to those standards. Panadero, Andrade, and Brookhart (2018) believe "formative assessment, done well, assists students to conceptualize what it is they are trying to learn, how they will know they are learning, and how they will move forward with next steps" (p. 14). When students know and can articulate what they are supposed to learn, their mental, emotional, and motivational processes are conceptualized in striving for outcomes that promote learning. Heritage (2012) suggests and Gustafson et al. (2019) concurs that when teachers help students understand the goal being aimed for, the criteria for meeting the goal, how to make judgments about their learning in relation to the goal, and how to utilize strategies to direct their own learning, students can then self-regulate successfully and achieve higher levels of learning. Ultimately, the structure for aligning standards, assessment, and daily instructional practices requires what Heritage (2012) calls a joint enterprise between teachers and students where each plays a distinctive, yet complimentary, role with the common purpose of furthering learning.

Perhaps the most salient benefit of formative assessment has been its impact on student achievement. Clark (2010) contends that formative assessment promotes "high levels of student achievement and greater equity of student outcomes" (p. 344). Clark's contention is supported by Ozan and Kincal's (2018) recent study conducted in a fifth-grade social studies class over the

course of 28 weeks. Ozan and Kincal (2018) examined the effects of formative assessment practices on academic achievement. In the study, the experimental group of students participated in formative assessment practices and the control group of students did not participate in formative assessment practices. At the conclusion of the study, the experimental group showed significantly higher academic achievement when compared with the control group (Ozan & Kincal, 2018). Govender (2019) and Dorn (2010) both find compelling and substantial bodies of evidence that supports Ozan and Kincal's (2018) findings. In fact, both researchers agree integrating structured and responsive formative assessment within instruction improves learning outcomes and helps close achievement gaps, especially for children with low achievement (Govender, 2019; Dorn, 2010). As the research suggests, when formative assessment is successfully integrated within instruction, its most salient benefit is the impact it has on student achievement.

Challenges of Formative Assessment

The implementation of formative assessment has proven to be challenging. Cotton (2017) observes one of the challenges of formative assessment use in today's classrooms is that teachers lack the understanding needed to implement formative assessment effectively. This lack of understanding leads to a second challenge of formative assessment which is low self-efficacy. Volante and Beckett (2011) suggest and Sondergeld et al. (2010) concur that formative assessment underutilization is due to teacher low self-efficacy in implementing formative assessment as well as synthesizing and interpreting assessment results. Govender (2019) and Heitink et al. (2016) suggest a final challenge of formative assessment implementation is a result of the varying definitions and differing conceptualizations teachers have of formative assessment.

Formative assessment is underutilized in today's classrooms because teachers lack understanding of its purposes and processes. Govender (2019) states a "teachers' lack of understanding of the theoretical underpinnings of formative assessment strategies – and their integration with pedagogy and learning – [is] a major cause of the ineffective implementation thereof" (p. 5). Cotton (2017), Dorn (2010), and DeLuca et al. (2012) agree and find that most teachers have some level of understanding of what formative assessment is or are familiar with assessment techniques, yet fail to implement within the context of instruction because they do not understand the rationale for integrating or using those techniques. When teachers lack understanding or purpose of formative assessment, students struggle to know leaning goals and fail to achieve learning outcomes. Clark (2012b) contends that assessment and instruction are a reciprocal process that teachers need to grasp and understand theoretically so they can move students forward in their learning. Kanjee (2020) believes that when teachers possess the knowledge and awareness of the purposes and functions of formative assessment, learners will actively engage in the learning process and teachers will collect evidence that leads to enhanced instruction.

Teacher low self-efficacy is another challenge of formative assessment use in today's classrooms. The research suggests there are several contributing factors that result in teacher low self-efficacy. Green (2019) observes one of the factors of low self-efficacy is teachers' inability to implement formative assessment effectively or produce given attainments. Volante and Beckett (2011) suggest a contributing factor of low self-efficacy is teachers lack confidence in synthesizing assessment results. Sondergeld et al. (2010) find teachers struggle in interpreting or changing their teaching practices in response to student data. Govender (2019) explains low self-efficacy is a result of teachers struggling to understand learner thinking processes because they

are using formative assessment as technical tools rather than purposeful strategies. The research suggests there are several contributing factors that result in teacher low self-efficacy. It is apparent that more help is needed for teachers if they are to implement formative assessment with fidelity and realize improved self-efficacy outcomes.

Govender (2019), Heitink et al. (2016), and Koh et al. (2015) suggest another challenge of formative assessment use in the classroom is that teachers possess varying definitions and differing conceptualizations of formative assessment, which result in a wide variety of practices that hinder its implementation. This confusion can be attributed to multiple definitions and meanings of formative assessment. Cotton (2017) agrees stating that formative assessment can be confusing because it can mean many different things to many different people. When teachers possess a vague and fragmented conceptualization of formative assessment, they are unable to effectively use strategies that elicit evidence of student learning (Govender, 2019). Teachers need to understand that formative assessment is a complex and dynamic process that is seamlessly integrated throughout instruction with the intent and purpose of yielding information about student learning (Clark, 2012b; Stefl-Mabry, 2018; Trumbull & Lash, 2013). This knowledge is imperative if teachers are to conceptualize how to effectively utilize formative assessment and embed it in instruction.

Historically educators have used formative assessment to positively affect learning by strengthening the learning experience for students, promoting reflective teaching, providing a structure for aligning standards, assessment, and instruction, and providing students with feedback that ultimately improves learning outcomes. When formative assessment is not utilized appropriately in the classroom, teachers are ineffective in meeting instructional goals which directly impacts student learning outcomes. As a result of this literature review, it is apparent

more research needs to be conducted on how formative data use influences teaching and learning, and the impact the formative process has on student outcomes.

Methods

Participants

This action research study was conducted in the Winterset Community School District located in Winterset, Iowa. Winterset is a rural community, most notably known for the birthplace of John Wayne and our bridges made popular by the book and movie, *The Bridges of Madison County*. With a population of approximately 5,000, Winterset is conveniently located 15 minutes from both interstate highways, I-80 to the north, and I-35 to the east. Winterset is approximately 25 minutes driving distance from Des Moines, the state's capital.

Winterset Community School District (WCSD), distinguished as one of the top Iowa School Districts in 2020, is home to Winterset Elementary School, Winterset Middle School, and Winterset Jr.-Sr. High School. WCSD's student population is 88% white, 1.0% Asian, 0.21% Black, 3.1% Hispanic, 0.16% American Indian, 2.1% Mixed Race (two or more), and 0.11% Pacific Islander. Additionally, 30% of WCSD's student population qualify for free or reduced meals.

Winterset Elementary houses grades PK-3. Enrollment for the 2020-2021 school year is 569 students. The Winterset Elementary student population is 84% white, 1.23% Asian, 0.18% Black, 3.16% Hispanic, 0.18% American Indian, and 2.46% Mixed Race (two or more). Additionally, 32% of elementary students are receiving free or reduced meals.

The first-grade classroom where the action research was conducted has 19 students: 13 females and 6 males. The participants in this action research study were four females and one male. The demographics of the study group include 100% Caucasian and 100% low socio-

economic status. At the time of the action research, there were no students on an IEP. However, five of the students were receiving Title I services in literacy for 20 minutes per day. The students in the group studied were selected because they scored between the 2nd and 11th percentile on the Fall FastBridge Early Reading English assessment given September 3, 2020. An average student scores between the 40th and 75th percentile, and students scoring in the 15th percentile are considered well below grade-level expectations and in need of intensive intervention (FastBridge Learning Support, 2020). The study was conducted during the daily literacy block in the general education setting.

Measures

During the action research study, quantitative data and qualitative data was collected. The quantitative measures were collected from weekly FastBridge Word Segmenting progress monitoring data. Qualitative data was collected through researcher observations and anecdotal notes. Data collection facilitated answering the research question: *If the researcher uses formative data to drive instructional decision-making, then what impact will those instructional decisions have on student outcomes?* Data was collected over a series of four weeks, starting the week of September 20, 2020, and concluded the week of October 18, 2020. Additionally, baseline FastBridge Word Segmenting data collected before the action research study was used as a quantitative data measures comparison.

Procedures

To determine which students to focus on for the action research study, the researcher utilized baseline data from the Fall FastBridge Early Reading English Assessment. According to the FastBridge (2020) website, an average student falls into the 40th to 70th percentile rank. Students who score in the 15th percentile rank are considered well below grade-level

expectations and need additional intensive support to achieve grade-level goals (FastBridge Learning Support, 2020). Numerous research studies have validated the predictive validity of the 15th percentile rank as highly predictive of student performance (FastBride Learning Support, 2020).

Based on this information, the researcher chose students who scored between the 2nd and 11th percentile. Students' Word Segmenting baseline scores ranged from 15 to 28 correct letter sounds. The end of the year goal for first-graders is 32 correct letter sounds. The specific skill the researcher chose to focus on was segmenting words into their individual sounds. The researcher utilized the research-based PRESS Phonemic Awareness 3 (PA-3) intervention to target skill acquisition.

Data Collection

Once the students were grouped, the researcher began the PRESS PA-3 intervention with students. During the intervention, the researcher met daily with the group and participants practiced segmenting consonant-vowel-consonant (CVC) words and words with blends. Formative assessment data was collected daily through observation of students' skills acquisition and recorded in anecdotal notes. Data was also collected weekly from the Word Segmenting progress monitoring. At the conclusion of the action research study, the researcher used the Word Segmenting progress monitoring data and compared the mean scores to determine if they were significantly different or relatively the same.

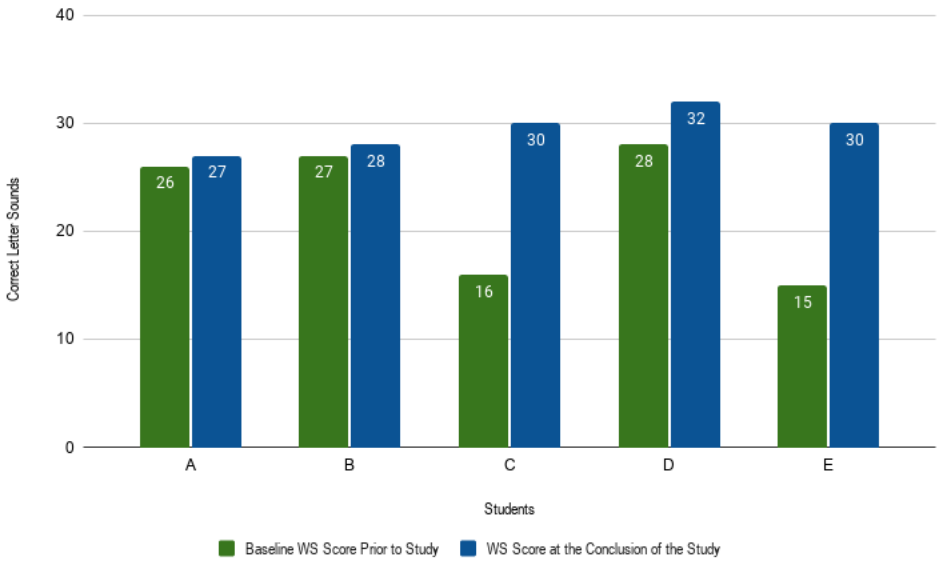
Results

The variables the researcher analyzed in this study were the mean scores from the weekly FastBridge Word Segmenting progress monitoring. The independent variable was formative data use during the intervention and the dependent variable was student outcomes. The Word

Segmenting progress monitoring mean scores taken from weekly data collected during the study were then compared for statistical significance. Figure 1 represents the individual baseline word segmenting scores for each student, as well as the students' Word Segmenting progress monitoring scores at the conclusion of the study.

Figure 1

FastBridge Word Segmenting Progress Monitoring Scores (2020)



When interpreting the graph, students A and B have relatively similar scores for their baseline and their concluding score. Student D increased her sound segmentation score by four points. However, students C and E experienced significant growth in their scores over the course of the study.

The data represented in Table 1 includes the number of samples in the study and the mean score for each week of data collected during the study. Figure 2 is a graphical representation of the same information with a trend line for the mean scores.

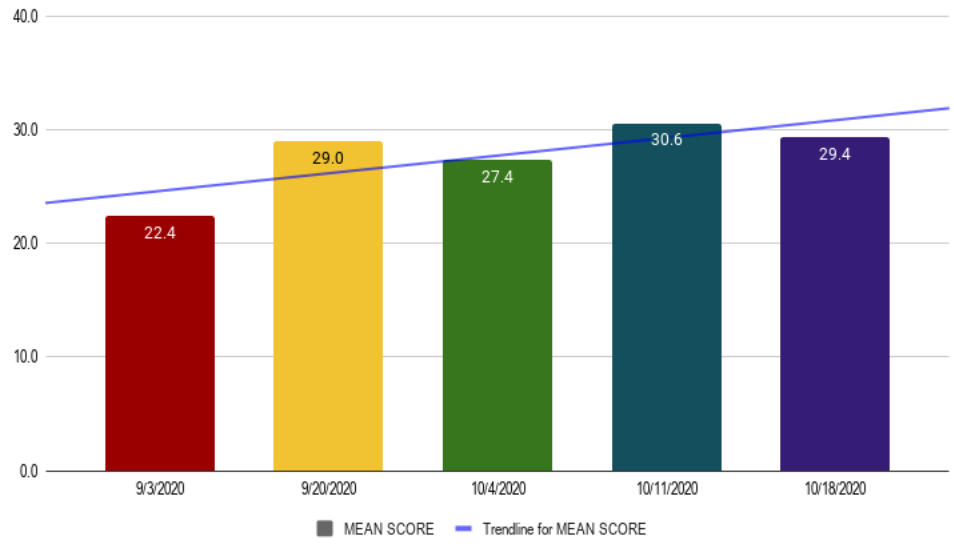
Table 1

Mean Scores (2020)

	N	Mean
09/03/20	5	22.4
09/20/20	5	29.0
10/04/20	5	27.4
10/11/20	5	30.6
10/18/20	5	29.4

Figure 2

Word Segmenting Mean Scores (2020)



To analyze the variables in this study, a one-way within subjects (or repeated measures) ANOVA was conducted to compare the five FastBridge Word Segmenting progress monitoring mean scores to determine if they were significantly different or relatively the same. The ANOVA test was chosen by the researcher because it is used to test a hypothesis that three or more means are equal. The Null Hypothesis was: The mean FastBridge student scores on each date are equal. The Alternative Hypothesis was: At least one mean is different at a 0.05 significance level.

Using technology, the researcher ran the ANOVA test to calculate the p-value. The p-value was used by the researcher to determine any significance in the mean scores. If the p-value is less than 0.05, there is statistical significance between the data being analyzed; if the p-value is more than 0.05, there is no statistical significance. Table 2 shows the results of the one-way within subjects (or repeated measures) ANOVA that was conducted to compare the effect of formative data use on student outcomes. As the table suggests, there was a statistically significant difference between groups with .011684 practical significance [F (4, 20) = 4.27, p = .011684]. Since the p-value was smaller than the significance level, there is evidence to reject the null hypothesis. Enough evidence exists to conclude that at least one mean is different than the rest of the means.

Table 2

ANOVA Summary

	df	**F**	**p**
Between Treatments	4	4.27	.011684
Within Treatments	20		

Discussion

Summary of Major Findings

The purpose of this study was to determine how formative data use influences teaching and learning, and what impact the formative process has on student outcomes. The findings of this study suggest that formative data use had a positive impact on student learning outcomes. When comparing the mean scores form the Word Segmenting progress monitoring data, the ANOVA test indicates a statistically significant difference between mean scores.

When comparing results of this study to the guidance in the literature, student-focused instruction that was responsive to students' needs lead to improved outcomes for three of the five students in the study. The students showing the most significant growth were students C and E whose baseline scores were well below their peers at the beginning of the study.

Limitations of the Study

Facing unprecedented times, the researcher endeavored to conduct this study with validity and reliability. However, several limitations presented themselves that could affect the reliability of the results. The first limitation was the timing of the study. The study was conducted during the COVID pandemic. As a result of the pandemic, first-grade students hadn't completed a full school year of Kindergarten and had been away from school for approximately six months. This resulted in the second limitation which was the small sample size. Initially, the researcher anticipated using all students in the class as participants. As the study unfolded, the researcher realized this wasn't going to be plausible and had to refine the focus of the research study. Admittedly, the small sample size makes generalization difficult. Another limitation was the length of the study. A more thorough analysis may have resulted if the study had been conducted for a longer period of time. Ideally, the study should have been conducted beginning with the start of the school year and ending at the conclusion of the first quarter of school. An additional limitation could have resulted because the teacher was the researcher. Based on the needs of students, the researcher implemented some interventions immediately following baseline data collection because of huge skill deficit. This may have created bias which could have impacted study results.

Further Study

While there is research that supports the benefits of using formative assessment in the classroom, a review of the literature reveals the most prevalent problem is lack of teachers' understanding regarding what formative assessment is and how to effectively use it. When teachers lack understanding of formative assessment, they are unsure how to respond to what they learn about their students which results in failure to use the data for a formative purpose (Trubull and Lash, 2013; Govender, 2019). An area for further research could be best practices of formative assessment implementation. Koh et al. (2015) believe "There is a need to build teachers' capacity in formative assessment practices" (p. 212). Sondergeld et al. (2010) concurs and believes teachers equipped with knowledge and skills in implementing formative assessment will result in transformed classroom practices.

An additional area for further research would involve how lesson pacing and time constraints impede the formative process. A review of the literature suggests a lack of formative assessment implementation due to time constraints and inflexible lesson pacing. In fact, Govender (2019) observed "to stay on track with the Annual Teaching Plans (ATP), teachers tended to focus on content coverage, which resulted in surface learning with little time allotted to formative assessment that could have helped to identify and address individual and group learning needs" (p. 9). Further research in this area is needed to help teachers facilitate students' development of conceptual understanding within the constraints of the ATP.

Conclusion

Formative assessment is a systematic process where evidence is continually gathered concerning student learning (Heritage, 2007). The goal of formative assessment is to make responsive changes in teaching based on an understanding of what students know (Boston,

2002). Through this action research, the researcher discovered more about the formative process. The information gained during the action research study helped the researcher understand how formative data influences teaching and learning, and what impact the formative process has on student outcomes. Formative assessment continues to be one of the most powerful tools to guide instructional decision-making. Clark (2008) contends that "wherever the challenge of promoting effective learning exists in our classrooms there also exists the opportunity for better formative assessment" (p. 1).

References

Boston, C. (2002) The concept of formative assessment. *Practical Assessment, Research, and Evaluation, 8*, 1-4. https://doi.org/10.7275/kmcq-dj31

Chappuis, J. (2015). *Seven strategies for assessment for learning* (2nd ed.) Pearson.

Clark, I. (2008). Assessment is for learning: Formative assessment and positive learning interactions. *Florida Journal of Educational Administration & Policy, 2*(1), 1-15. Retrieved on July 15, 2020, from https://files.eric.ed.gov/fulltext/EJ902994.pdf

Clark, I. (2012a). Formative assessment: Assessment is for self-regulated learning. *Educational Psychology Review, 24*(2), 205-249. http://dx.doi.org.ezproxy.nwciowa.edu/10.1007/s10648-011-9191-6

Clark, I. (2012b). Formative assessment: A systematic and artistic process of instruction for supporting school and lifelong learning. *Canadian Journal of Education, 35*(2), 24+. https://link-gale-com.ezproxy.nwciowa.edu/apps/doc/A303072566/PROF?u=nwcollege&sid=PROF&xid=20a3761e

Clark, I. (2011). Formative assessment: Policy, perspectives and practice. *Florida Journal of Educational Administration and Policy, 4*(2), 158+. Retrieved September 11, 2020, from https://link-gale-com.ezproxy.nwciowa.edu/apps/doc/A329901250/PROF?u=nwcollege&sid=PROF&xid=7dbf40d4

Clark, I. (2010). Formative assessment: 'There is nothing so practical as a good theory'. *Australian Journal of Education, 54*(3), 341+. https://link-gale-com.ezproxy.nwciowa.edu/apps/doc/A243121713/PROF?u=nwcollege&sid=PROF&xid=1abcd2e4

Clinchot, M., Ngai, C., Huie, R., Talanquer, V., Lambertz, J., Banks, G., Weinrich, M., Lewis, R., Pelletier, P., & Sevian, H. (2017, March). Better formative assessment: Making

formative assessment more responsive to student needs. *The Science Teacher, 84*(3), 69+. Retrieved September 11, 2020, from https://link-gale-com.ezproxy.nwciowa.edu/apps/doc/A494100270/PROF?u=nwcollege&sid=PROF&xid=245a13c3

Cotton, D. (2017). Teacher's use of formative assessment. *Delta Kappa Gamma Bulletin*, *83*(3), 39-51.

Curry, K. A., Mwavita, M., Holter, A., and Harris, E. (2016, February). Getting assessment right at the classroom level: Using formative assessment for decision making. *Educational Assessment, Evaluation, and Accountability, 28*(1), 89-104. Retrieved July 8, 2020, from https://eric.ed.gov/?id=EJ1097317

DeLuca, C., Luu, K., Sun, Y., & Klinger, D. A. (2012). Assessment for learning in the classroom: barriers to implementation and possibilities for teacher professional learning. *Assessment Matters, 4*, 5-29. https://link.gale.com/apps/doc/A307413794/AONE?u=nwcollege&sid=AONE&xid=ed35ff77

Dorn, S. (2010). The political dilemmas of formative assessment. *Exceptional Children, 76*(3), 325+. Retrieved on September 13, 2020, from https://link-gale-com.ezproxy.nwciowa.edu/apps/doc/A222678504/PROF?u=nwcollege&sid=PROF&xid=abeeafb6

FastBridge Learning Support. (2020, July 28). *FASTfact: Benchmark scores.* FastBridge Learning. https://fastforteachers.freshdesk.com/support/solutions/articles/5000788775-fastfact-benchmark-scores

Fisher, D., & Frey, N. (2014). *Checking for understanding: Formative assessment techniques for your classroom*. ASCD.

Ford-Connors, E., Robertson, D. A., and Paratore, J. R., (2016, March). Classroom talk as (in)formative assessment. *Voices From the Middle, 23*(3), 50-57. Retrieved July 8, 2020,

from https://secure.ncte.org/library/NCTEFiles/Resources/Journals/VM/0233-mar2016/VM0233Classroom.pdf

Govender, P. (2019). Formative assessment as 'formative pedagogy' in Grade 3 mathematics. *South African Journal of Childhood Education, 9*(1). Retrieved September 11, 2020, from https://link-gale-com.ezproxy.nwciowa.edu/apps/doc/A605559467/PROF?u=nwcollege&sid=PROF&xid=8f84fb8d

Grant, L. W., and Gareis, C. R. (2017, April 28). *Formative assessment.* Oxford Bibliographies. https://www.oxfordbibliographies.com/view/document/obo-9780199756810/obo-9780199756810-0062.xml#:~:text=The%20first%20reference%20to%20the,clarifying%20the%20roles%20of%20evaluation.

Green, F. (2019). An exploration into the value of formative assessment and the barriers associated with the implementation of formative strategies. In Kowalczuk-Walêdziak M., Korzeniecka-Bondar A., Danilewicz W., & Lauwers G. (Eds.), *Rethinking Teacher Education for the 21st Century: Trends, Challenges and New Directions* (pp. 203-222). Verlag Barbara Budrich. https://doi.gor/10.2307/j.ctvpb3xhh.17

Greenstein, L. (2010). *The fundamentals of formative assessment* [ebook edition]. ASCD. http://www.ascd.org/publications/books/110017/chapters/The-Fundamentals-of-Formative-Assessment.aspx

Gustafson, S., Nordstrom, T., Andersson, U. B., Falth, L., & Ingvar, M. (2019). Effects of a formative assessment system on early reading development. *Education, 140*(1), 17+. https://link-gale-com.ezproxy.nwciowa.edu/apps/doc/A602231378/PROF?u=nwcollege&sid=PROF&xid=41aceae7

Heitink, M. C., Van der Kleij, F. M., Veldkamp, B. P., Schildkamp, K., & Kippers, W. B. (2016). A systematic review of prerequisites for implementing assessment for learning in classroom practice. *Educational Research Review, 17,* 50-62. https://doi.org/10.1016/j.edurev.2015.12.002

Heritage, M. (2007). Formative assessment: What do teachers need to know and do? *Phi Delta Kappan, 89*(2), 140–145.https://doi-org.ezproxy.nwciowa.edu/10.1177/003172170708900210

Heritage, M. (2012). Gathering evidence of student understanding. In J. H. McMillan (Ed.). *Sage Handbook of Research on Classroom Assessment* (pp. 179-196). Sage Publications. Retrieved from https://www.sagepub.com/sites/default/files/upm-binaries/50739_ch_11.pdf

Holler, E. W., & Beers, B. (2012, December). Formative assessment: focusing instruction on student needs. *Principal Leadership, 13*(4). https://link-gale-com.ezproxy.nwciowa.edu/apps/doc/A381054499/PROF?u=nwcollege&sid=PROF&xid=e6f7391a

Kanjee, A. (2020). Exploring primary school teachers' use of formative assessment across fee and no-fee schools. *South African Journal of Childhood Education, 10*(1). Retrieved September 11, 2020 from https://link-gale-com.ezproxy.nwciowa.edu/apps/doc/A629000124/PROF?u=nwcollege&sid=PROF&xid=f565cfc2

Keeley, P. (2017, December). Embedding formative assessment into the 5E instructional model. *Science and Children, 55*(4), 28+. https://link-gale-com.ezproxy.nwciowa.edu/apps/doc/A518337115/PROF?u=nwcollege&sid=PROF&xid=4da4f172

Koh, K., Lim, L., Tan, C., & Habib, M. (2015). Building teachers' capacity in formative assessment: The Singapore example. *The New Educational Review, 40*(2), 211+. https://link-gale-com.ezproxy.nwciowa.edu/apps/doc/A563837190/PROF?u=nwcollege&sid=PROF&xid=8f6078a3

Mcglynn, K., and Kelly, J. (2017, December). Using formative assessment to differentiate instruction. *Science Scope, 41*(4), 22-25. Retrieved July 8, 2020, from https://link-gale-com.ezproxy.nwciowa.edu/apps/doc/A518030491/PROF?u=nwcollege&sid=PROF&xid=28f38625

McMillan, J. H., Venable, J. C., & Varier, D. (2013). Studies of the effect of formative assessment on student achievement: So much more is needed. *Practical Assessment, Research & Evaluation, 18*(2). Retrieved on September 22, 2020, http://ezproxy.nwciowa.edu/login?url=https://www-proquest-com.ezproxy.nwciowa.edu/docview/2366796239?accountid=28306

Nolen, S. B. (2011, Fall). The role of educational systems in the link between formative assessment and motivation. *Theory Into Practice, 50*(4), 319-326. Retrieved September 11, 2020, from http://www.jstor.com/stable/41331060

Ozan, C., & Kıncal, R. Y. (2018). The effects of formative assessment on academic achievement, attitudes toward the lesson and self-regulation skills. *Educational Sciences: Theory & Practice, 18*(1), 85–118. https://doi-org.ezproxy.nwciowa.edu/10.12738/estp.2018.1.0216

Panadero, E., Broadbent, J., Boud, D., & Lodge, J. M. (2018). Using formative assessment to influence self- and co-regulated learning: The role of evaluative judgement. *European Journal of Psychology of Education*, 1-23. http://dx.doi.org.ezproxy.nwciowa.edu/10.1007/s10212-018-0407-8

Sondergeld, T. A., Bell, C. A., & Leusner, D. M. (2010). Understanding how teachers engage in formative assessment. *Teaching and Learning, 24*(2), 72+. Retrieved September 11, 2020, from https://link-gale-com.ezproxy.nwciowa.edu/apps/doc/A227654239/PROF?u=nwcollege&sid=PROF&xid=198c6561

Stefl-Mabry, J. (2018). Documenting evidence of practice: The power of formative assessment. *Knowledge Quest, 46*(3), 50+. https://link-gale-com.ezproxy.nwciowa.edu/apps/doc/A523063189/PROF?u=nwcollege&sid=PROF&xid=d6e2f7b8

Trumbull, E. and Lash, A. (2013, April). *Understanding formative assessment: Insights from learning theory and measurement theory.* WestEd. Retrieved on July 15, 2020, from https://www.wested.org/online_pubs/resource1307.pdf

Volante, L., & Beckett, D. (2011). Formative assessment and the contemporary classroom: Synergies and tensions between research and practice. *Canadian Journal of Education, 34*(2), 239+. https://link-gale-com.ezproxy.nwciowa.edu/apps/doc/A271594492/PROF?u=nwcollege&sid=PROF&xid=0b4f4113